PLANNED INSTRUCTION

A PLANNED COURSE FOR:

STEELS: Science, Technology and Engineering, Environmental Literacy and Sustainability

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Grade Level: Third Grade

Date of Board Approval: ____June 2025_____

Curriculum Map

Overview:
In grade 3, students will study the connection of the natural and human-made world through inquiry, problem-solving, critical thinking, and authentic exploration. Areas of focus will include, movement and interaction of objects, force and motion, similarities and difference in organisms, survival of organisms, changes to the organisms' environments and weather patterns.

Goals:

1. Marking Period One: Over a 45-day period of time, students will aim to understand:

Unit 1: Movement and Interaction of Objects (8 weeks)

- Plan and conduct investigations
- Provide evidence of the effects of balanced and unbalanced forces on the motion of an object
- Patterns can be used to predict motion
- Determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other
- Make and communicate observations

2. Marking Period Two: Over a 45-day period of time, students will aim to understand:

Unit 2: Similarities and Differences in Organisms (8 weeks)

- Analyze and Interpret data from fossils
- Make claims supported by evidence about problems and solutions regarding environmental change
- Develop models to describe that organisms have unique life cycles but many commonalities

3. Marking Period Three: Over a 45-day period of time, students will aim to understand

Unit 3: Survival of Organisms (8 Weeks)

- Analyze and interpret data about plant and animal traits
- Construct an explanation for how character variation benefits a species
- Construct an argument regarding how environment affects animal survival
- Physical and behavioral adaptations
- Traits can be influenced by environment

4. Marking Period Four: Over a 45-day period of time, students will aim to understand:

Unit 4: Changes to Organisms' Environments (8 weeks)

- Represent data in tables to describe typical weather conditions
- Obtain and combine information to describe climates
- The merit of a design solution that reduces the impacts of a weather-related hazard.

Curriculum Plan

Unit Overview
How do objects affect the motion of other objects? Although objects in contact exert forces on each other, electric and magnetic forces between a pair of objects do not require that the objects be in contact. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. The idea of determining patterns and using them to make predictions connects to the idea that scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. The engineering design idea that different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints could connect to multiple science concepts such as that forces that do not sum to zero can cause changes in the object's speed or direction of motion and that the size of the forces between two magnets depends on the properties of the magnets, their distance apart, and on their orientation relative to each other. The first connection could be made by challenging students to determine whether balanced or unbalanced forces will best solve the problem of changing the speed or direction of motion. The second connection could be made by supporting students to design a way to move something using magnets. In either case, criteria and constraints should be determined by the class before beginning to design a solution and students' solutions can be tested to determine which best solves the problem, given the criteria and constraints.

Unit 1:Movement and Interaction of Objects

Standards	Big Idea	Essential Questions
Science: 3.2.3.A Make and communicate observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. (3-PS2-2) 3.2.3.B Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (3-PS2-1) 3.2.3.C Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. (3-PS2-3) 3.2.3.D Define a simple design problem that can be solved by applying scientific ideas about magnets. (3-PS2-4) **Technology & Engineering:** 3.5.3-5.A Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems. 3.5.3-5.W Describe the properties of different materials. **Environmental Literacy & Sustainability:** K-4 Strand 2.3.A. Human-environment interactions: Learners identify ways that people depend on, change, and are affected	A change in motion of interacting objects can be explained and predicted by forces. All forces between objects, regardless of size or direction, arise from only a few types of interactions.	How can one predict an object's continued motion, changes in motion, or stability? What underlying forces explain the variety of interactions observed?

by the environment. K-4 Strand 1.B. Designing investigations: Learners design simple environmental investigations. K-4 Strand 1.A. Questioning: Learners develop questions that help them conduct simple investigations and learn about the environment		

Textbook and Supplemental Resources

Mystery Science IXL Epic

Learning Objectives/DOK Levels:

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object.	Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables	Patterns of change can be used to make predictions. Cause and effect relationships are routinely identified, tested, and used to explain change. Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process.	DOK Level 2 (Skills/Concepts): Representing data in graphical displays involves organizing information to reveal patterns, which requires reasoning but is primarily focused on understanding and applying concepts. DOK Level 3 (Strategic Thinking): Producing data through observations or measurements to explain a phenomenon or test a solution involves critical thinking and analyzing evidence, which requires more complex reasoning. DOK Level 3 (Strategic Thinking): Planning and conducting an investigation involves collaboration, controlling variables, and conducting

Forces that do not sum to zero can cause changes in the object's speed or direction of motion Types of Interactions electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.	are controlled and the number of trials considered. Ask questions that can be investigated based on patterns such as cause and effect relationships. Define a simple problem that can be solved through the development of a new or improved object or tool.		fair tests, which requires strategic thinking and systematic problem-solving. DOK Level 2 (Skills/Concepts): Asking investigable questions based on observed patterns involves understanding relationships and reasoning, but it does not yet involve complex analysis or problem-solving. DOK Level 2 (Skills/Concepts): Defining a problem that can be solved through design requires identifying issues and applying basic reasoning, but it is focused on concept development and does not involve extended thinking.

Core Activities and Corresponding Instructional Methods

Be specific. List activities related to materials/resources, include links, article titles etc.

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Forces, Motion, &	**Anchor phenomenon**	Constructing Explanations			1 session - 60 minutes

Magnets Unit (Invisible Forces)	A skateboard that has been modified to work on ice and be powered by the wind. During the introduction, students generate observations and questions about the phenomenon and create an initial conceptual model to explain how the ice board works. Develop See/Think/Wonder with students Develop Driving Questions Board (DQB)	Defining Problems and Designing Solutions Engaging in Argument from Evidence Developing and Using Models Obtaining and Communicating Information			
	Lesson 1: **Session1:** In this session, students make a folded piece of cardboard jump high in the air, propelled by the pulling force of a rubber band. Wrap-up slides and teacher-led discussion	Planning and Carrying Out Investigations Constructing Explanations and Designing Solutions Students recognize the cause and effect relationship between the forces	Unit Readings Online Video: Tug-of War Hands-on Activity Vocabulary	IXL: Third Grade 3: Identify Pushes and Pulls How do balanced and unbalanced forces affect motion? How do mass and force affect motion?	2 sessions - 30 minutes each

	Session 2: Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. They should understand that the person riding the ice board applies pushes and pulls to the ice board to work against the wind and make the board move. Students can revise their explanation and/or drawing by adding in arrows showing the rider pulling the sail back, and the air pushing the sail forward. Students may also add arrows showing the rider pushing the board forward with their feet.	acting on an object and the direction of its motion.		Compare the speed of moving objects	
	Lesson 2: **Session 1** In the hands-on activity, students will use their	Asking Questions and Defining Problems	Vocabulary Unit Readings Building Bridges	Epic Books: Building Big Bridges Bridges	2 sessions - 30 minutes each

	knowledge of forces to build a strong bridge that supports as many pennies as possible -- using only paper. Wrap-Up and Teacher-Led Discussions **Session 2:** Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. They should understand that certain materials on the ice board help the person riding it to push or pull in certain ways to make it move. Students can revise their explanation and/or drawing by adding where the special ropes are that attach to the ice board rider's waist.	Constructing Explanations and Designing Solutions	Golden Gate Bridge Exhibition Bridge Building Online Mystery Science Mini Lesson- How do you build a bridge that lasts 100 years?		
	Lesson 3: **Session 1:**	Developing and Using Models	Vocabulary Unit Readings	IXL: Third Grade Science :	2 sessions - 30 minutes each

	Students build a model trapeze. They make observations and take measurements of the motion of that model and use that data to predict the motion of a real trapeze. Wrap-up and Teacher-led discussions **Sessions 2:** Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. They should understand that for the ice board to work, it needs to have very high friction in some places, and very low friction in others. Students can revise their explanation and/or drawing by adding where the friction should be high: ● Between boots and the board	Planning and Carrying Out Investigations		Identify pushes and pulls How do balanced and unbalanced forces affect motion? How do mass and force affect motion? Compare the speeds of moving objects	

	• Between gloves and the handle And adding where the friction should be low: • Between the blades and the ice				
	Lesson 4: **Session 1:** students use ring magnets and common objects to discover the push and pull of magnets and how magnets attract certain types of metals. Wrap-Up and Teacher-Led Discussions. **Session 2:** In the anchor connection, students will complete a reading about compasses. This lesson gives students an	Asking Questions and Defining Problems	Vocabulary Unit Readings Mini Lesson- How are Magnets made? Iron Fortified Cereal Activity	IXL: Identify magnets that attract or repel Label magnets that attract or repel Compare strengths of magnetic forces Solve problems using magnets Epic: Magnetism: First Science Push and Pull: Learning about Magnets	2 sessions - 30 minutes each

	opportunity to explore magnets and it serves as an introduction to the next lesson when they are using magnets to engineer a solution to a problem. As a result of this lesson being an introduction to the next lesson, students will not make a significant connection back to the anchor phenomenon.				
	Lesson 5: **Session 1:** In this lesson, students investigate magnetic attraction and repulsion. In the activity, Invent a Magnetic Lock, students apply their scientific ideas about magnets to create a useful product: a magnetic lock that can open a paper door. Students engage in the	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions	Vocabulary Unit Readings Video Activities	Solve problems using magnets	2 sessions - 30 minutes each

	engineering design process to test and improve their designs. Wrap-Up and Teacher-Led Discussions. **Session 2:** Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. They should understand that designing a mount that will hold a compass in an easily visible spot will make navigation easier for the ice board rider. Students can revise their explanation and/or drawing by adding a way to mount a compass on their ice board; this could be by attaching it to the mast, or adding an extra stand in front of the mast to hold it up, or attaching				

	it down on the board, or anything else.				

Assessments:

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson 1 Assessment Lesson 2 Assessment Lesson 3 Assessment Lesson 4 Assessment Lesson 5 Assessment	Unit Assessment Performance Assessment

Unit Overview
What causes the differences between organisms? The idea that some kinds of plants and animals that once lived on Earth are no longer found anywhere connects to the idea that reproduction is essential to the continued existence of every kind of organism through the concept of survival of organisms. Reproduction also connects to the concept of inheritance and that many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. All the previous concepts also connect to each other through the concept of patterns: patterns in fossils, patterns of reproduction across organisms, and patterns of characteristics of organisms, both inherited and from interactions with the environment.

Unit 2: Similarities and Differences in Organisms

Standards	Big Idea	Essential Questions
Science: 3.1.3.A Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. (3-LS1-1) 3.1.3.C Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variations of these traits exist in a group of similar organisms. (3-LS3-1) 3.1.3.D Use evidence to support the explanation that traits can be influenced by the environment. (3-LS3-2) 3.1.3.E Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. (3-LS4-1) **Technology & Engineering:** 3.5.3-5.N Identify why a product or system is not working properly. **Environmental Literacy & Sustainability:** K-4 Strand 2.1.B. Earth's living systems: Learners identify basic similarities and	Organisms have characteristic structures, functions, and behaviors that allow them to grow, reproduce, and die. Analyze and interpret data to make sense of phenomena using logical reasoning. Offspring resemble, but are not identical to, their parents due to traits being passed from one generation to the next via genes. Variation among individuals of the same species can be explained by both genetic and environmental factors. Comparisons between species provides evidence that species evolved from common	How do the structures of organisms enable life's functions? How are the characteristics of one generation related to the previous generation? Why do individuals of the same species vary in how they look, function, and behave? What evidence shows that different species are related?

differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment in which they live, and how their environment affects them. K-4 Strand 1.F. Working with models and simulations: Learners use models to represent environmental relationships, patterns, and processes. K-4 Strand 1.G. Drawing conclusions and developing explanations: Learners develop explanations that address their questions about the environment. K-4 Strand 1.E. Organizing and analyzing information: Learners describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.		

Textbook and Supplemental Resources

Mystery Science IXL Epic

Learning Objectives/DOK Levels:

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. Many characteristics of organisms are inherited from their parents. Different organisms vary in how they look and function because they have different inherited information. Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve	Develop models to describe phenomena. Analyze and interpret data to make sense of phenomena using logical reasoning. Use evidence (e.g., observations, patterns) to support an explanation. Analyze and interpret data to make sense of phenomena using logical reasoning. Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships.	Patterns of change can be used to make predictions. Similarities and differences in patterns can be used to sort and classify natural phenomena. Cause and effect relationships are routinely identified and used to explain change. Observable phenomena exist from very short to very long time periods.	DOK Level 3 (Strategic Thinking): Developing models requires students to use reasoning and apply their understanding to represent and explain complex phenomena, involving analysis and synthesis of information. DOK Level 3 (Strategic Thinking): Analyzing and interpreting data involves deeper reasoning to evaluate and understand phenomena, requiring critical thinking and the ability to draw conclusions based on evidence. DOK Level 3 (Strategic Thinking): Using evidence to support an explanation involves the application of reasoning and analysis to build and justify conclusions, which requires more strategic thinking. DOK Level 3 (Strategic Thinking): Similar to the previous statement, this involves analyzing and interpreting data with

both inheritance and environment. The environment also affects the traits that an organism develops. Some kinds of plants and animals that once lived on Earth are no longer found anywhere. Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.			reasoning to understand phenomena, requiring deeper analysis and evaluation. DOK Level 2 (Skills/Concepts): Representing data in graphical displays involves organizing and interpreting information to identify patterns, which requires reasoning but is focused more on application than complex analysis.

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Fossils & Changing Environments Unit (Animals Through Time)	**Anchor Phenomenon** Students generate observations and questions about a watery cave and create an initial conceptual model to explain how and why they think this is happening See/Think/Wonder with students Develop Driving Questions Board (DQB)	Analyzing and Interpreting Data Obtaining, Evaluating, and Communicating Information			1 Day 30 minutes
	Lesson 1 **Session 1** Students explore the idea that the rock under our feet sometimes contains fossils, and investigate how these fossils reveal changes in habitat through time. **Session 2**	Analyzing and Interpreting Data	Vocabulary Unit Readings Mini Lessons: Ice Age Biggest Shark	Epic Books: Fossils and Rocks by Kimbery M. Hutmacher Fossils by Andrea Rivera IXL Intro to Fossils	4 Days 30 minute sessions

	Students use paper to create a model fossil dig. They identify traits of fossils to determine what the habitat looked like when these organisms were alive. Then they use this information to figure out where some Mystery Fossils belong in their fossil dig. Wrap-up slides & teacher-led discussion. **Session 3** Students revisit the question, How do we know what extinct animals looked like? Make revisions to their See/Think/Wonder page. Students should understand, the cave was not always full of water. There was a time in the distant past when animals could have gone into and out				

	of the cave without swimming				
	Lesson 2 **Session 1** Students analyze data from dinosaur fossils in order to provide evidence about the appearance and behavior of those dinosaurs when they were living. **Session 2** Students compare the traits of dinosaur fossils with the traits of modern animals in order to help a paleoartist draw a dinosaur as accurately as possible. Wrap-up slides & teacher-led discussion. **Session 3** Students will revisit the explanation/drawing on the	Analyzing and Interpreting Data Engaging in Argument from Evidence	**Vocabulary** **Unit Reading** Mini Lessons: Were Dragons Ever Real? Are Unicorns Real?	IXL Compare fossils to modern organisms Compare ancient and modern organisms: use observations to support a hypothesis	3 Days 30 minute sessions

	See/Think/Wonder chart. Students can make revisions based on previous learning from the lesson. Students revisit the question How do we know how extinct animals moved? Students should understand, the skull in the cave likely belonged to an animal that ate plants and other animals, and the animal likely had furry skin				
	Lesson 3- **Session 1** Students will learn about how fossil dinosaur tracks reveal how quickly a dinosaur was running. **Session 2** Students figure out if they could have won a race with a dinosaur that was just their size.	Using Mathematics and Computational Thinking Planning and Carrying Out Investigations	Vocabulary Unit Reading	**IXL:** Compare ancient and modern organisms: use observations to support a hypothesis	3 Days 30 minute sessions

	To determine the winner, students will compare the length of their running steps with the dinosaur's steps. Teacher led discussion **Session 3** Students will revisit the explanation/drawing on the See/Think/Wonder chart. Students can make revisions based on previous learning from the lesson. Students should understand that the footprints were likely formed by an animal walking in the cave when it was wet but not full of water.				
Life Cycles Unit (Circle of Life)	Anchor Phenomenon **Session 1** Students will begin thinking about different cycles that	Developing and Using Models Constructing Explanations			1 Day 30 Minute session

	living things go through. Students should understand that even though they are different organisms, there are similarities in their cycles. See/Think/Wonder with students Develop Driving Questions Board (DQB)				
	Lesson 1 **Session 1** Students explore animal life cycles by thinking about their birthday buddies—all the animals that were born on the exact same day as they were born—and what happens to those birthday buddies over the course of their lives. **Session 2** Students develop a	Developing and Using Models Planning and Carrying Out Investigations	Vocabulary Unit Reading Mini Lessons: Why do Flies Just Appear in the Trash? Are Butterflies the Only Animals…	**IXL:** **L.1** Read animal life cycle diagrams	3 Days 30 minute sessions

	model to compare the life stories of different animals. Using this model, students discover that although the lives of animals can be very different, they all have in common birth, growth, reproduction, and death. Wrap-up slides & teacher-led discussion. **Session 3** Students will revisit the explanation/drawing on the See/Think/Wonder chart. Students can make revisions based on previous learning from the lesson. Students should discuss the question, how can we affect an animal's life cycle? Students should understand that bats go through life cycles, too. For animals to go through the				

	growth phase of their life cycle, they have to eat. The bats are eating when they stick their heads in the flowers.				
	Lesson 2 **Session 1** Students investigate mosquito life cycles and habitats and discover the role of mosquitoes in carrying diseases such as malaria. **Session 2** In part 1, students evaluate the merits of different solutions for getting rid of mosquitoes at various locations in a town. **Session 3** In part 2, students design a solution to help the town deal with an abundance of mosquitoes resulting	Obtaining, Evaluating, and Communicating Information Constructing Explanations and Designing Solutions	Vocabulary Unit Reading Mini lessons: What is the most dangerous animal in the world?	**IXL:** L.2 Construct animal life cycle diagrams M.4 Read and construct flowering plant life cycle diagrams	3 Days 30 minute sessions

	from a very rainy summer. **Session 4** Students will revisit the explanation/drawing on the See/Think/Wonder chart. Students can make revisions based on previous learning from the lesson. Think about the question, what do animals do at different times of year? Students should understand, a bat's life cycle may last many years, but they also go through daily cycles of resting and being awake.				
	Lesson 3 **Session 1** In this session, students learn how and why flowers are pollinated. **Session 2**	Developing and Using Models Analyzing and Interpreting Data	Vocabulary Unit Reading Mini Lesson: Why do we have allergies?	**IXL:** M.4 Read and construct flowering plant life cycle diagrams	3 Days 30 minute sessions

	In the hands-on activity, students will make flower models out of paper and bee models out of pipe cleaners. Students fly their bees from flower to flower and observe what happens to the flower's pollen during this process. **Session 3** Wrap up with a teacher led discussion about observations.Students wonder: Why do plants grow flowers? Students learn: Saguaros grow new flowers every spring. This cycle repeats every year.				
	Lesson 4 **Session 1** In this lesson students learn about why plants grow fruit. **Session 2**	Analyzing and Interpreting Data	Vocabulary Unit Reading Mini Lesson: Is a Tomato a Fruit or Veg		3 Days 30 minute sessions

	In the hands-on activity, Science Fruit or Vegetable, students examine common grocery produce and predict if each item is a science fruit or science vegetable. Then they take a closer look at slices of the produce and search for seeds. **Session 3** Teacher led discussion: students wonder: How do seeds turn into new plants? Students learn: Saguaro flowers turn into saguaro fruit. This cycle repeats every year				
	Lesson 5 **Session 1** In this session, students discover that while there is great diversity among flowering plants, they all share similar life cycles. They	Developing and Using Models	Vocabulary Unit readings Mini Lesson: Do Bees Make Honey	IXL: L.4 Compare different animals' life cycles L.3 Compare stages of an animal's life cycle	3 Days 30 minute sessions

	all start from seeds, grow, and eventually reproduce through the process of pollination. **Session 2** In the hands-on activity, Future Flowers, students observe and predict how changes to the pollinators affect plant reproduction, which affects the life cycles of those plants. **Session 3** Teacher led discussion: Students learn: The bats pollinate the cacti and help them progress through their life cycle.				

Assessments:

Diagnostic	Formative	Summative

See, Think, Wonder Chart Science Journal	**Fossils & Changing Environments:** Lesson 1 Assessment Lesson 2 Assessment Lesson 3 Assessment **Life Cycles:** Lesson 1 Assessment Lesson 2 Assessment Lesson 3 Assessment Lesson 4 Assessment Lesson 5 Assessment	Unit assessment in Mystery Science Performance Task

Unit Overview
What affects organisms' survival? The idea that being part of a group helps animals obtain food, defend themselves, and cope with changes connects to the idea that for any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all in that both ideas are about the survival of kinds of organisms. These ideas can also connect to survival of individuals within a group and that sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. In order to identify the differences in characteristics between individuals that may provide an advantage, it is helpful to look at the patterns of variation of a given characteristic among individuals in a species (e.g., longer or shorter thorns on individual plants, dark or light coloration of animals).

Unit 3: Survival of Organisms

Standards	Big Idea	Essential Questions
Science: 3.1.3.B Construct an argument that some animals form groups that help members survive. (3-LS2-1) 3.1.3.F Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. (3-LS4-2) 3.1.3.G Construct an argument with evidence that in a particular habitat, some organisms can survive well, some survive less well, and some cannot survive at all. (3-LS4-3) **Technology & Engineering:** 3.5.3-5.A Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems. **Environmental Literacy & Sustainability:** K-4 Strand 2.1.B. Earth's living systems: Learners identify basic similarities and differences among a wide variety of living organisms. They explain ways that living organisms, including humans, affect the environment in which they live, and how their environment affects them. K-4 Strand 1.F. Working with models and simulations: Learners use models to	Many species live in groups which can increase the chances of survival for individuals and their relatives. In any particular environment, individuals with particular traits may be more likely than others to survive and produce offspring. When the environment changes, some individuals in a population may have traits that provide a reproductive advantage which over many generations can change the make-up of a population.	How do organisms interact in groups so as to benefit individuals? How does genetic variation among organisms affect survival and reproduction? How does the environment influence populations of organisms over multiple generations?

represent environmental relationships, patterns, and processes. K-4 Strand 1.G. Drawing conclusions and developing explanations: Learners develop explanations that address their questions about the environment. K-4 Strand 1.E. Organizing and analyzing information: Learners describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.		

Textbook and Supplemental Resources

Mystery Science IXL Epic

Learning Objectives/DOK Levels:

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size. Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. The environment also affects	Construct an argument with evidence, data, and/or a model. Use evidence (e.g., observations, patterns) to construct an explanation. Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships.	Cause and effect relationships are routinely identified and used to explain change. Patterns of change can be used to make predictions.	DOK Level 3 (Strategic Thinking): Constructing an argument using evidence, data, or models involves reasoning, evaluating information, and synthesizing various sources of evidence, requiring deeper analysis and critical thinking. DOK Level 3 (Strategic Thinking): Constructing an explanation based on evidence involves applying reasoning and analysis to form conclusions, which goes beyond basic understanding and requires strategic thinking. DOK Level 2 (Skills/Concepts): Representing data in graphical displays requires organizing information to

the traits that an organism develops. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.			identify and reveal patterns, which involves reasoning and application of concepts, but not complex analysis.

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Heredity, Survival, & Selection Unit (Fates of Traits)	The **anchor phenomenon** for this unit is one of the most successful kinds of animals on Earth: ants! How can such small creatures survive in so many places with such a huge population of individuals? During the introduction, students generate observations and questions about the phenomenon and create a list of possible explanations for the phenomenon. Students will gather clues during and after each lesson in this unit to help them improve their understanding and explanations.	Engaging in Argument from Evidence.			1 day - 45 minutes

	See/Think/Wonder with students Develop Driving Questions Board (DQB)				
	Lesson 1 **Session 1** - students examine plant traits and use that information as evidence to help them identify an unknown fruit. Students will look for similarities and differences in the leaves, flowers, and fruits found at the grocery store to sort them into groups and identify patterns of inheritance. **Session 2** - In this hands-on activity, Fruit Market Mysteries, students look for similarities and differences in the leaves, flowers, and	Analyzing and Interpreting Data	Mini-lessons Mystery Science Activity Unit Reading Vocabulary	IXL - Observe Traits	2 sessions - 30 minutes each.

	fruits of plants found at the grocery store to sort them into groups and identify patterns of inheritance. Wrap-up slides & teacher-led discussion.				
	Lesson 2 **Session 1** - In this session, students explore the extreme trait variation of different dog breeds -- and pet pigeon breeds! **Session 2** - In the hands-on activity, Pigeon Pairings, students analyze trait similarities and differences among parent, offspring, and sibling pigeons. They interpret this data to discover that the variation and inheritance of traits creates a pattern that	Analyzing and Interpreting Data	Mini-lessons Unit Reading Vocabulary Engineering Online Simulation Unit Reading Vocabulary	IXL - Observe and Compare Traits IXL - What Affects Traits? Use Observations to Support a Hypothesis	2 sessions - 40 minutes each

	explains why we see such extreme traits in artificially selected animal breeds. Wrap-up slides & teacher-led discussion.				
	Lesson 3 **Session 1** - In this session, students explore how variation in the toe scales of green lizards provides some individuals with an advantage when it comes to climbing and surviving. **Session 2** - In the hands-on activity, Lizard Island, students participate in a simulation to explore what happens to these green lizards when a new species of brown lizards is introduced to their environment. Students gather	Constructing Explanations and Designing Solutions Analyzing and Interpreting Data Using Mathematics and Computational Thinking	Unit Reading Vocabulary Activity Video Mini-lessons	IXL - Introduction to Adaptations IXL - Animal Adaptations: Beaks, Mouths, and Necks IXL - Animal Adaptations: Feet and Limbs IXL - Animal Adaptations: Skins and Body Coverings	2 sessions - 35 minutes each

	evidence to explain how a change to the environment can cause a certain trait to become more common in a population over time through the process of natural selection. Wrap-up slides & teacher-led discussion.				
	Lesson 4 **Session 1** - In this session, students discover why dogs' expressions, like tail wagging, are so useful when living in a pack. In the hands-on activity, Field Journal, students watch videos of different animals that live in groups to simulate observing them in their natural habitats. They discuss	Obtaining, Evaluating, and Communicating Information Engaging in Argument from Evidence	Mini-lessons Videos Activity Vocabulary	Epic - Camouflage - Changing to Hide IXL - Benefits of Group Behavior: North American Caribou IXL - Benefits of Group Behavior: African Wild Dogs IXL - Benefits of Group Behavior: Leaf Cutter Ants	2 sessions - 35 minutes each

	and record their observations, and construct an explanation of how living in groups helps these animals survive. Wrap-up slides & teacher-led discussion. **Session 2** - Students wonder: How do animals change in different environments? Students learn: Ants do a huge number of different things in the face of challenges, such as building bridges or rafts out of their own bodies. These behaviors help them be successful all around the world.				
	Lesson 5 **Session 1** - In this session, students examine how physical	Constructing Explanations and Designing Solutions	Vocabulary Unit Reading		2 sessions - 45 minutes each

	traits can be influenced by the environment. **Session 2** - In the hands-on activity, Astronaut-in-Training, students analyze how a NASA astronaut's traits changed during his "year in space." Then they measure some of their physical traits (arm strength, height, and balance) and predict how their own traits might change after living in space. Wrap-up slides & teacher-led discussion.		Activity Video 1 Video 2 Mini Lesson		

Assessments:

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson 1 Assessment Lesson 2 Assessment Lesson 3 Assessment	Performance Task Unit Assessment

	Lesson 4 Assessment Lesson 5 Assessment	

Unit Overview
How does the climate affect organisms? The idea that some kinds of plants and animals that once lived on Earth are no longer found anywhere (LS4.A as in 3-LS4-1) connects to the idea that when the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. And environmental changes can connect to the concepts that climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years and that a variety of natural hazards result from natural processes.

Unit 4: Changes to Organisms' Environments

Standards	Big Idea	Essential Questions
Science: 3.3.3.A. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season (3-LS4-4) 3.3.3.B. Obtain and combine information to describe climates in different regions of the world. (3-ESS2-2) 3.3.3.C. Make a claim supported by evidence about the merit of a design solution that reduces the impacts of a weather-related hazard (3-ESS3-1) **Technology & Engineering:** 3.5.3-5.A Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems. 3.5.3-5.B Examine information to assess the trade-offs of using a product or system. 3.5.3-5.C Follow directions to complete a technological task. 3.5.3-5.D Predict how certain aspects of their daily lives would be different without given technologies. 3.5.3-5.K Judge technologies to determine	Humans depend on biodiversity, the variety of species and ecosystems, for resources and human actions can impact the diversity of species. Weather and climate are shaped by complex interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. Natural processes can cause sudden or gradual changes to Earth's systems, some of which may adversely affect humans.	What is biodiversity, how do humans affect it, and how does it affect humans? What regulates weather and climate? How do natural hazards affect individuals and societies?

the best one to use to complete a given task or meet a need. 3.5.3-5.H Determine factors that influence changes in a society's technological systems or infrastructure. 3.5.3-5.J Explain how technologies are developed or adapted when individual or societal needs and wants change. 3.5.3-5.Q Practice successful design skills. 3.5.3-5.R Apply tools, techniques, and materials in a safe manner as part of the design process. 3.5.3-5.T Apply universal principles and elements of design. 3.5.3-5.V Interpret how good design improves the human condition. 3.5.3-5.I Design solutions by safely using tools, materials, and skills 3.5.3-5.BB Illustrate how, when parts of a system are missing, it may not work as planned. 3.5.3-5.CC Describe how a subsystem is a system that operates as a part of another larger system. 3.5.3-5.L Demonstrate how tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing. 3.5.3-5.O Describe requirements of designing or making a product or system.		

3.5.3-5.Y Identify the resources needed to get a technical job done, such as people, materials, capital, tools, machines, knowledge, energy, and time. 3.5.3-5.Z Create a new product that improves someone's life. 3.5.3-5.AA Create representations of the tools people made, how they cultivated to provide food, made clothing, and built shelters to protect themselves. **Environmental Literacy & Sustainability:** K-4 Strand 2.1.A. Earth's physical systems: Learners describe characteristics of Earth's physical systems, including air, water, and land. They explain how these systems interact with one another and identify changes in the physical environment over time. They provide examples of how physical systems affect living organisms, including humans. K-4 Strand 2.3.A. Human-environment interactions: Learners identify ways that people depend on, change, and are affected by the environment. K-4 Strand 1.E. Organizing and analyzing information: Learners describe data and organize information to search for relationships and patterns concerning the environment and environmental topics.		

K-4 Strand 1.G. Drawing conclusions and developing explanations: Learners develop explanations that address their questions about the environment.		

Textbook and Supplemental Resources

Mystery Science IXL Epic

Learning Objectives/DOK Levels:

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Ecosystem Dynamics, Functioning, and Resilience When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations. Populations live in a variety of habitats and change in those habitats affects the organisms living there. Climate describes a range of an area's typical weather conditions and the extent to which those	Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. Obtain and combine information from books and other reliable media to explain phenomena.	A system can be described in terms of its components and their interactions. Patterns of change can be used to make predictions. Cause and effect relationships are routinely identified, tested, and used to explain change. Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). Science affects everyday life.	DOK Level 4 (Extended Thinking): Making a claim about the merit of a solution involves extended thinking, as it requires evaluating multiple factors, analyzing how evidence aligns with criteria, and constructing a well-supported argument. DOK Level 3 (Strategic Thinking): Obtaining and synthesizing information from multiple sources to explain phenomena involves reasoning, analysis, and integrating various pieces of evidence, requiring strategic thinking.

conditions vary over years. A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.			

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Stormy Skies (Weather and Climate)	The **anchor phenomenon** is an icy hailstorm that happens during warm summer weather. In the hands-on activity, Summer Ice Storm, students generate observations and questions about the phenomenon and create an initial explanation of how it happened. During the introduction, students generate observations and questions about the phenomenon and create a list of possible explanations for the phenomenon. Students will gather clues during and after each lesson in this unit to help them improve	Analyzing and Interpreting Data Constructing Explanations Designing Solutions Engaging in Argument from Evidence Developing and Using Models Obtain and Communicate Information			1 session (30-40 Minutes)

	their understanding and explanations. Develop See/Think/Wonder DQB (Driving Question Board).				
	Lesson 1: **Session 1**: In this session, students make a gas trapper. The students add hot water to clear cups to observe evaporation firsthand. They observe the condensation of the water vapor on the sides of the cup. They use this model to understand how clouds are formed. Wrap-up slides and teacher-led discussion. **Session 2:** Students revisit the explanation and/or	Planning and Carrying Out Investigations Developing and Using Models Analyzing and Interpreting Data	Vocabulary Unit Readings Disappearing Puddles Activity Two Cups Activity How is Syrup Made?	IXL: Read a Thermometer Compare temperatures on a thermometer Collect and Graph Temperature data What's the difference between weather and climate? Weather and climate around the world. Weather or Climate: Cite Text Use climate data to make predictions	2 sessions: 30 minutes each

	drawing that they worked on during the Anchor Phenomenon. They should understand that high temperatures at ground level cause water to evaporate. Less water on the ground means more water in the air which can form clouds. Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. They should understand that warm temperatures at ground level causes water to evaporate. This leads to water in the air in the form of clouds. Students can revise their explanation and/or drawing by adding: water on the ground evaporates & becomes water gas in			Use data to describe US climates Use data to describe world climates	

	the air and/or that clouds are made of water				
	Lesson 2: **Session 1:** In this session, students create a small book to record their notes, identify different types of clouds, and think about wind direction to figure out if a storm is heading their way. **Session 2:** Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. Students should understand that the tallest clouds tend to cause storms. The tops of those tall storm clouds are very high in the sky, where it is very cold. Students can	Analyzing and Interpreting Data	Vocabulary Unit Readings More Sights in the Sky Activity Weather Watcher's Journal ELA- Extension: Cloud Poetry	IXL: Read a Thermometer Compare temperatures on a thermometer Collect and Graph Temperature data What's the difference between weather and climate? Weather and climate around the world. Weather or Climate: Cite Text Use climate data to make predictions Use data to describe US climates	2 sessions- 30-40 minutes

	revise their explanation and/or drawing by adding details about the temperature difference between the ground and high in the sky and drawing and labeling the clouds as cumulonimbus.			Use data to describe world climates	
	Lesson 3: **Session 1:** In this lesson,Snow Fort Weather, students organize daily temperature data from three snowy towns into a table so that they can compare weather conditions and predict which town is most likely to have the best weather for a snow fort festival next year. **Session 2:** Students revisit the explanation and/or drawing that they	Obtaining, Evaluating, and Communicating Information Analyzing and Interpreting Data	Vocabulary Unit Readings Writing Read A Thermometer Activity Look for weather patterns Activity Coldest place on Earth Min-Lesson	IXL: Read a Thermometer Compare temperatures on a thermometer Collect and Graph Temperature data What's the difference between weather and climate? Weather and climate around the world. Weather or Climate: Cite Text	2 sessions- 3-40 minutes

	worked on during the Anchor Phenomenon. They should understand that the tops of the tallest clouds are cold enough to freeze water into ice, even when it is hot on the ground. This is where hailstones form. Students can revise their explanation and/or drawing by adding that water freezes below 32° Fahrenheit and melts above that temperature.			Use climate data to make predictions Use data to describe US climates Use data to describe world climates	
	Lesson 4: **Session 1:** In the activity, Climate Decoder, students color one part of a world map to figure out the different climates of that region.		Vocabulary Unit Readings Create a Travel Poster	IXL: Read a Thermometer Compare temperatures on a thermometer Collect and Graph Temperature data	2 sessions- 30-40 minutes

	Students then combine maps and search for global climate patterns. **Session 2:** Students revisit the explanation and/or drawing that they worked on during the Anchor Phenomenon. They should understand that the long term climate high in the air is very different from the climate on the ground. On the ground it can be hot or cold; but high in the air, it is always freezing cold. Students can revise their explanation and/or drawing by coloring in the "Sky Climate Map" on their sheet, neatly showing the key information from the earlier lessons about: Water evaporating from the ground and		Mini-Lesson:How do polar animals survive in the cold?	What's the difference between weather and climate? Weather and climate around the world. Weather or Climate: Cite Text Use climate data to make predictions Use data to describe US climates Use data to describe world climates	

	eventually forming clouds in the sky; The temperature on the ground and in the sky; The name and appearance of the type of clouds that cause these storms.				
	Lesson 5: **Session 1:** In the activity, Design a Windproof House, students build paper house models. Then, using limited materials, students design multiple solutions that will make their houses sturdy enough to survive a wind storm, and compare the merits of their solutions. **Session 2:** Students should understand that	Asking Questions and Defining Problems Constructing Explanations and Designing Solutions Analyzing and Interpreting Data	Vocabulary Unit Readings Activity Mini Lessons: Why are Tornados hard to predict? Which is worse? Hurricane or a tornado?	XL: Read a Thermometer Compare temperatures on a thermometer Collect and Graph Temperature data What's the difference between weather and climate? Weather and climate around the world. Weather or Climate: Cite Text	2 sessions- 30-40 minutes

	weather affects people around the world. The more we understand severe weather, such as hailstorms, the more we can help keep people safe. Students will not update the Summer Ice Storm sheets that they had been updating up to this point. Instead, they will record their design plan for a device that will protect cars and trucks from hail damage. This design will be referenced in the Performance Task at the end of the unit.			Use climate data to make predictions Use data to describe US climates Use data to describe world climates	

Assessments:

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson 1 Assessment Lesson 2 Assessment Lesson 3 Assessment Lesson 4 Assessment Lesson 5 Assessment	Unit Assessment Performance Task